April 21, 2004

MEMORANDUM FOR CHAIRPERSONS, U.S. DEFENSE SCIENCE BOARD
UK DEFENCE SCIENTIFIC ADVISORY COUNCIL

SUBJECT: Terms of Reference —Identifying and Sustaining U.S. Department of Defense/UK Ministry of Defence Defense Critical Technologies (Study)

Technology plays a vital role in the success of U.S. and UK armed forces. The development of useful technology arises from different sources: Government may itself develop unique technology for which there is no evident commercial use; Government may provide the initial impetus to enable industry to take over future development; or Government may choose to adapt technology developed solely in the market place. None of these sources, alone, is capable of satisfying the need for defense technology.

Governments can not afford to duplicate market-driven technology development, while the marketplace does not always develop technology which fulfills U.S. DoD or UK MoD niche needs or in the required time frame. For example, there is a requirement for a small number of radiation hardened integrated circuit chips for some missions but there is no commercial market to fulfill this need. High Performance Computing (HPC) represents another technology in which military needs are not fully met. As industry commits to massively parallel machines there exist several computing domains that are resistant to this technological approach. Quantum computing may hold the key to future military HPC needs but this unproven technology is still several years, if not decades away.

The Study will develop a methodology to identify unique defense technologies as well as commercially developed technologies needing augmentation to fulfill defense niche areas, and then apply the methodology to develop a list of defense critical technologies. The Study should focus its effort on high leverage, differentiated and transformational technologies. The Study may then use this list of defense critical technologies to further assess the tools available to the U.S. DoD or UK MoD to develop its critical technology needs. Some of the considerations the Study should examine include mechanisms to develop niches in pre-existing technologies, foster new technology until the commercial marketplace takes over, or develop technology without any expectation of commercial development; the analysis should include a review of the applicable acquisition/business case. Finally, the Study should consider the impact of technology development in other countries and the implications that this may have on Anglo-U.S. unique needs.

The Study will specifically address U.S. DoD and UK MoD technological needs in the following areas: power systems; HPC; materials, including energetic, structural and functional; advanced micro- and opto-electronics; communication systems; security and information assurance; vaccines and pharmaceuticals; and human factors. The

Study should assess relevant technologies and the means of transferring them to the defense arena using the above methodology.

This Study will operate under an exchange of letters. The Defense Science Board and Defence Scientific Advisory Council will work in parallel, comparing interim findings and working together to produce a unique UNCLASSIFIED report.

The UK part of the Study will be sponsored by the UK MoD Science and Technology Director and chaired by Dr Julia King. The Executive Secretary and UK Point of Contact will be Dr. Alexander Churchill.

The U.S. part of the Study will be co-sponsored by me as the acting Under Secretary of Defense (Acquisition, Technology and Logistics) and the Director, Defense Research and Engineering. Admiral William Studeman and Dr. Anita Jones will serve as Study Co-Chairpersons. Mr. John Grosh will serve as the Executive Secretary and Commander David Waugh will serve as the Defense Science Board Secretariat Representative.

Michael W. Wynne
Acting Under Secretary of Defense
(Acquisition, Technology and Logisitics)

Mike Markin
Science & Technology Director